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March 13, 2007

VIA E-MAIL

Mr. Doyle W. Wilson
Illinois Environmental Protection Agency
1021 North Grand Avenue East
P.O. Box 19276
Springfield, Illinois 62794-9276

Re: Consent Decree – Change in Project Coordinator

Dear Doyle:


Pursuant to Paragraph 41 of the Consent Decree and in conjunction with the completion of the physical construction phase, the RD/RA Performing Settling Defendants hereby notify Illinois EPA of a change in lead Project Coordinator and Alternate Project Coordinator. SECOR International representatives will cease lead contractor responsibilities and Michael Hirt (Project Coordinator) and Jay Corgiat (Alternate Project Coordinator) of Environmental Information Logistics, LLC. ("EIL"), as previously approved by Illinois EPA, will assume these responsibilities. EIL's Statement of Qualifications, which previously were submitted and accepted by your office, are attached.

We understand that you have requested and will soon receive from EIL the Statement of Qualification materials for CABENO, which will perform the periodic well sample collection and site maintenance activities under EIL's direction during the sampling and monitoring phase.

Please feel free to contact me at any questions or comments.

Very truly yours,

SEYFARTH SHAW LLP

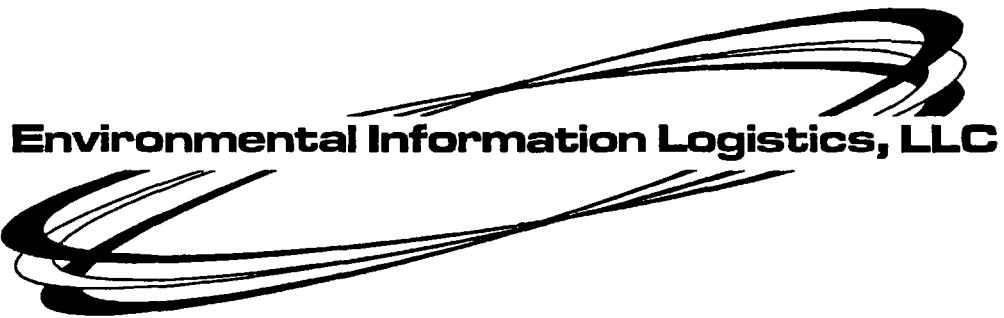

Thomas D. Lupo

TDL:ls

encls

cc: Gerald Karr, Esq.
Paul Jagiello, Esq.
Scott Moyer
Michael Hirt
Jay Corgiat
Craig Simonsen

STATEMENT OF QUALIFICATIONS



Submitted To:

**Illinois Environmental Protection Agency
1021 N. Grand Avenue East
Springfield, Illinois 62702**

August 10, 2006

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COMPANY BACKGROUND AND PHILOSOPHY

Environmental Information Logistics (EIL) is a diversified environmental consulting, engineering, and information management firm headquartered in Illinois with regional offices in Illinois, Michigan, and Ohio. We provide economical solutions to the diverse environmental, engineering, and data management challenges confronting owners/operators of solid waste disposal and industrial and commercial facilities. We are committed to assisting clients resolve environmental issues quickly, economically, and efficiently by delivering the highest quality of work in a cost-effective, timely, manner.

EIL's ability to provide clients with responsive solutions while understanding and respecting clients' business goals has enabled us to grow and prosper as a specialist service provider. We provide consulting services nationwide for large clients such as Waste Management, Allied Waste/BFI, and Onyx/Superior, smaller, family-owned operations such as Sexton Companies and Mercedes Development, municipalities such as the Village of Bensenville, and to other environmental/engineering consultants.

PROFESSIONAL EXPERIENCE

With over 250 years combined experience on our staff, EIL is focused on providing state-of-the-art technical support in the areas of:

- Landfill engineering and design;
- Engineering, design, operation, and assessment of groundwater, landfill gas, and leachate, monitoring and collection systems;
- Permitting and regulatory compliance;
- Geologic and hydrogeologic investigations; and
- Environmental compliance monitoring program management for groundwater, landfill gas, and leachate collection systems at solid waste facilities.

Our staff includes engineers, environmental scientists, biologists, chemists, hydrogeologists, and licensed professionals in both geology and engineering.



Environmental Engineering and Consulting Services – Qualifications and Experience

Some of EIL's specific capabilities are listed in the following pages. Also, in the following sections we have included project descriptions that highlight our capabilities, as well as resumes of some of the key members of our team.

SOLID WASTE ENGINEERING SERVICES

- Landfill engineering and design
- Closure / Post -closure care plans and implementation
- Landfill gas collection and control system engineering and design
- Energy recovery assessment and design
- Environmental compliance monitoring and reporting
- Solid waste and air permitting
- Geologic and hydrogeologic studies
- Supplemental permit applications and significant modifications
- Operations and maintenance
- Leachate management
- Project feasibility assessment, financial analysis, and development
- Equipment procurement
- Gas purchase/gas sales agreement assistance
 - Gas flow/gas quality measurement and troubleshooting
 - Clean Air Act permitting and regulatory negotiation
 - Title V operating permits
 - Assistance with understanding state regulations
 - Knowledge and experience with new source performance standards (NSPS) for landfills and Emissions Guidelines (EG) programs
 - Compliance management program development and implementation
 - NSPS emissions/stack testing
 - Power plant/flare control system integration to maintain NSPS compliance
- Collection system assessments to maximize energy plan production and minimize off-site migration and odors
- Groundwater impact assessments

- Groundwater monitoring program development and modification
- Hydrogeologic investigations, pump tests, groundwater modeling, and installation of groundwater monitoring devices
- Corrective action plans
- Remedial action activities
- Statistical evaluation of groundwater monitoring data
- Construction Quality Assurance
- Construction Management
- Construction Estimates, Bid Documents and Evaluation

Broad Experience

EIL personnel have performed more than a thousand solid waste projects at hundreds of sites. We have encountered and solved nearly every type of challenge faced by the industry. Our landfill development engineers are accomplished professionals who have succeeded under varied site conditions so you can benefit from our experience with:

- vertical expansions
- canyon fills
- quarries and strip mines
- sites with high groundwater table and uplift
- weak and poorly drained subsoils
- soil deficits and surpluses
- site specific abundance of a soil type not typically considered standard by regulatory definitions, but can be proven by site-specific demonstration to function satisfactorily as an alternative design
- special seismic conditions

Practicality

Our talents reach beyond the traditional permitting, design, and construction service capabilities offered by our competitors. EIL engineers have practical experience in comprehensive management and facility operation. We deliver benefits to you in the areas of constructability; construction sequencing; special waste handling; litter, mud, and dust management; optimum compaction; and financial requirements for closure and post-closure.

Pioneering New Methods

EIL personnel have been leaders in the application of new products and methods, which have transformed the industry in recent years. We continue to develop improvements to reduce your operating and capital costs, and to maximize airspace utilization. EIL's customers have benefited from our early pioneering in:

- Development and implementation of non-soil daily cover.
- Synthetic and non-synthetic materials to stabilize steeper slopes and increase airspace
- Combined extraction systems for leachate and landfill gas, resulting in lower capital and O&M costs
- Groundwater Leachate and Gas Data Management Systems

Our environmental professionals combine their talents to provide you with some of the most advanced engineering and technology in the solid waste management industry today. From planning and permitting to design and construction, our scientists and engineers continually push the edge of technology forward, searching for the best available solutions for solid and hazardous waste management.

Landfill Design Services

Many factors affect landfill site selection and design approaches, including land use compatibility, wetland impacts, regulatory permitting requirements and community interaction. EIL works closely with you to help make the best decision possible when selecting a design approach. Our design services range from performing siting investigations and evaluations to helping you obtain the necessary construction and operation permits relating to the following:

- New Sites
- Horizontal / Vertical Expansions
- Leachate Collection / Treatment
- Gas Collection and Management
- Operations Plan
- End Use Planning
- New Cells
- Airspace Utilization and Phasing Plans
- Composite Liners
- Final Covers and Vegetation
- Stormwater Management

- Support Facilities
- Closure / Post-Closure Care Plans

EIL's dedicated staff continually strives to provide the most technologically-advanced yet cost-effective designs for environmentally secure landfills. Our complete scope of services includes siting investigations; permit modifications; liner and cap design; leachate collection and removal systems; phased construction and operational sequencing; operating and reporting plans; gas management; surface water management; closure plans; financial assurance estimates; and end use plans.

Liner Designs

From in-situ earthen liners to triple synthetic containment and underdrains, EIL's liner design experience, including landfill base floor, sideslope and final cover, can provide you with the information necessary to make the correct decisions concerning your future fill areas.

Cap Designs

Soil, FML and combination final cover systems with complete infiltration and leachate production analysis can aid you in determining what the appropriate cover technique for your facility is. Vegetation selection is another key component.

Phased Construction and Operational Sequencing

The proper planning and implementation of landfill construction can allow you to sequentially close out filled units and minimize potential risk.

Operating and Reporting Plans

Operating techniques and methods are not only a regulatory issue, but properly incorporated into your daily activities can extend the life of your facility.

Location Restrictions

Planning an expansion? Subtitle D requires extensive documentation to ensure the protection of the public and environment. EIL can provide the proper documentation you need to meet the new location restrictions for your expansion.

Closure / Post-Closure Care Plans and Implementation

Every year your facility pays out dollars for financial assurance to ensure the facility can be closed and cared for. Are you paying too much? EIL's streamlined closure designs can reduce your future risks and lower your annual financial assurance requirements.

Following closure, EIL can perform the required monitoring, maintenance, and reporting activities to comply with applicable permits and regulatory requirements.

End Use Plans

Open green space? 18-hole public golf course? Recreational area? EIL personnel have permitted and designed all of these as end use plans to ensure solid waste facilities remain a useful part of society.

Landfill Gas Design

Landfill gas can be an intimidating problem for a landfill owner. Just think about all the ways it can complicate the life of a landfill owner:

- **Odors.** Gas that isn't properly managed can cause odors, and those odors can cause complaints from nearby residents.
- **Regulatory Issues.** New federal and state regulatory programs that specifically address landfill gas emissions have recently been enacted. These regulations establish strict operating, reporting, and compliance requirements. Non-compliance with these regulations can lead to significant fines for the landfill owner.
- **Operations.** If you don't operate your collection system aggressively enough, odors and off-site migration can result. If you operate it too aggressively, a landfill fire can occur.
- **Safety.** Landfill gas is explosive. If it migrates off-site or seeps into on-site buildings undetected, it can be a significant liability for the landfill owner.

EIL's team of landfill gas experts have the experience to help you avoid all these problems, or get you out of trouble if you're already there. Our engineers, field technicians, and permitting specialists know the best way to engineer, construct, and operate gas collection systems and landfill gas to energy power plants. In addition, we know how to set up and implement effective, efficient compliance programs that minimize your costs but ensure that you're in compliance. Services that we provide to avoid the above problems include:

"Everything's easy when you know how to do it."
At EIL, we know how to do landfill gas.

- Gas Collection System Contract Operations and Maintenance
- Regulatory Permitting and Compliance Management
- Landfill Gas to Energy Projects
- Other Gas Collection System Services
- Design and Engineering
- Construction
- Construction Quality Assurance

By choosing EIL, you're hiring experience. Experience that will design your collection system right, install it right, operate it optimally, troubleshoot it if it's not operating right, and ensure that it's in compliance with the laundry list of

regulations that can't be ignored. All at a price that saves you money. In summary, it's experience that will make your life easier. Some of EIL's specific capabilities include:

Regulatory Permitting and Compliance

- Clean Air Act permitting and regulatory negotiation
- Title V operating permits
- Assistance with understanding state regulations
- Knowledge and experience with new source performance standards (NSPS) for landfills and Emissions Guidelines (EG) programs
- Compliance management program development and implementation
- NSPS and EG Annual Reports
- NSPS data collection/reporting
- NSPS emissions/stack testing
- NSPS surface scans and surveys

Gas Collection Engineering and Construction Quality Assurance

- NSPS Design Plans
- Construction designs and specifications
- Condensate removal and treatment
- Landfill flare design and construction
- Construction management
- Construction Quality Assurance (CQA) services

Collection System Operations and Maintenance

- Wellfield monitoring and tuning
- Wellfield startup activities
- Data management analysis and interpretation
- Wellfield performance
- Migration and odor control
- Collection system troubleshooting
- Collection and design repairs
- Subtitle D monitoring
- Groundwater/NPDES sampling

Need help with regulatory compliance?

EIL can help untangle the red tape.

Need help with gas collection?

EIL can help make sure things run smoothly.

- Leachate collection system pump, controls, and piping repairs and retrofits
- Gas Chromatograph calibrations and troubleshooting
- Explosive Gas Monitor calibrations

Recovery and Beneficial Use

- Project feasibility assessment, financial analysis, and development
- Design
- Construction management/inspection
- Equipment procurement
- Gas purchase/gas sales agreement assistance
- Utility interconnect assistance
- Contract operation, maintenance, and troubleshooting
- Gas flow/gas quality measurement and troubleshooting

Regulatory Air Permitting and Compliance

With the growing importance of air emission control regulations for solid waste landfills, EIL can help keep our clients' facilities in compliance. EIL staff has provided emissions modeling and permitting services for open and enclosed flares, turbines, reciprocating engines, sterling engines, and landfill VOC emissions in many states. We have also developed surface emission control systems for compliance with air pollution control requirements and for sites specifically requiring surface odor control in many states.

Landfill Gas Management and Utilization Systems

EIL staff have engineered and designed award-winning landfill gas management and utilization systems. Our staff has completed several hundred successful projects, from gas migration evaluation and control through gas recovery and beneficial use. Our staff has designed facilities for landfills ranging in size from small township landfills to large sites with capacities in excess of 200 million cubic yards.

Gas Collection System Engineering and Condensate Management

EIL staff has designed over 100 gas collection systems utilizing conventional vertical gas extraction well technology, horizontal gas collection systems that are installed in landfills during the filling operation, and combined leachate extraction/gas collection wells and header systems. We have provided numerous assessments of gas migration and prepared mitigation plans and designs. We have developed projects for lateral migration control involving gas extraction devices both inside the waste mass and outside the refuse boundary.

Landfill Gas Collection System Operations & Maintenance

EIL's landfill gas operations and maintenance services can help improve the performance of your landfill gas collection system safely and cost-effectively, and allow you and your staff to focus your efforts on running your recovery system. Not only are we focused on the efficiency of your system but also the site's compliance and additional ways to save you money. Our improvements could even increase profits at your recovery facility.

Landfill Gas Recovery and Beneficial Use Experience

EIL staff has been involved in more than 40 gas-to-energy projects including direct fuel gas use at landfill sites on a small scale, as well as electric power generation. Experience includes contract negotiations, economic analysis, permitting, design, bidding, and construction-related services at gas-to-energy facilities employing both reciprocating and turbine engines. Our staff has provided start-up services, operation and maintenance training, and troubleshooting services at these facilities.

Landfill Gas to Energy Assessment and Due Diligence

Requested by confidential client to perform technical and compliance due diligence for over thirty landfill gas power plants located across the United States. All work needed to be completed within three weeks of initial notice.

Assessed gas collection system, evaluated environmental concerns, and reviewed landfill gas production estimates. Assisted with evaluating the condition of plant equipment including the compression system and turbines.

Landfill Gas Power Plant Feasibility Study

Requested by confidential client to evaluate the feasibility of beneficially using landfill gas from one of the largest landfills in the United States. A power company was preparing to construct a 500MW natural gas fueled power plant adjacent to the landfill and asked EIL personnel to investigate the feasibility of three potential uses of the landfill gas:

- As a supplemental fuel in the turbines of the main power plant,*
- As a supplemental fuel in the heat recovery equipment of the main power plant, or*
- In separate combustion devices adjacent to the larger power plant*

EIL personnel estimated the quantity and quality of the gas being produced by the landfill, evaluated various types of equipment for all of the above scenarios, and assessed the compatibility of ancillary systems (gas compression, steam, control) between the main plant and the landfill gas plant. The assessment concluded that a separate landfill gas-fueled power plant adjacent to the main plant was the optimum scenario.

After the utility decided to proceed with the main power plant as well as the landfill gas project, EIL personnel prepared a conceptual site layout and conceptual design of the landfill gas-fueled plant.

Landfill Gas to Electric Energy Facilities Standard Designs

EIL personnel worked as part of a team to develop standard designs for Waste Management, Inc.'s Landfill Gas Recovery Program. A total of seven standard designs were developed. Three turbine designs were produced for one, two, and three Centaur turbine facilities utilizing Solar Centaur turbines and Solar fuel gas compressors. In addition, four reciprocating engine designs were produced for two-, three-, four-, and five-engine facilities utilizing Caterpillar #3516 engines and a single Dresser-Rand fuel gas compressor. The standard designs were produced with the intent of the individual designs being site adapted by the individual Waste Management landfills taking into consideration local code and utility constraints.

The team's work included detailed design and specification preparation for the following disciplines: project management, architectural, structural, HVAC, plumbing, electrical, and utility interconnect portions of the facility. We also worked with major equipment vendors. National code constraints and acoustical constraints were followed.

Site-Specific Landfill Gas to Electric Energy Facility Designs

Based on the standard designs summarized above, EIL personnel worked as part of a team to prepare site-specific detailed designs for more than 30 power plants over a 15-year period.

Operations and Maintenance Manuals

EIL personnel prepared site-specific operation and maintenance manuals and safety manuals for three gas to electric energy facilities owned by Waste Management of North America. The reciprocating engine facilities are associated with landfills in Littleton, Colorado; East Peoria, Illinois; Rochester, New York; Frankfort, New York; Heiskel, Tennessee; and Fairport, New York. Color artwork of the process flow sheets and preventive maintenance schedules were also prepared.

Groundwater and Environmental Compliance

EIL has conducted numerous hydrogeologic investigations at solid waste facilities. In addition, EIL personnel have experience in designing and implementing groundwater-related investigations under the CERCLA and Illinois Site Remediation Programs. Based on our technical strengths in hydrogeology, geochemistry, groundwater modeling (analytical and numerical), landfill design, and regulatory awareness, we have designed, implemented, and are managing groundwater and leachate monitoring programs that are both protective of the environment and cost-effective.

Landfill Leachate Management

Collection of two relatively new waste streams - leachate and landfill gas condensate - is now required under state and federal regulations. As methods for capture and collection become more effective, the volumes of these liquids

increase, making decisions about treatment, disposal, and storage more important than ever.

EIL can provide you with an experienced team to design and implement your project, meeting compliance and budgetary requirements. We offer comprehensive services in leachate and gas condensate collection, treatment, and disposal for public and private facilities.

Analysis

Landfill leachate and gas condensate handling are subject to local, state, and federal regulations. The EPA's toxicity characteristics (TC) rule can determine whether the hazardous waste management requirements of RCRA Subtitle C are applicable.

EIL can help you determine whether the material is treatable or has hazardous characteristics. Analysis and projection of leachate characteristics are important; volumes and concentrations will vary considerably from site to site, and over the life of a facility.

Evaluation

Even if leachate or condensate is not classified as hazardous, organic and inorganic constituents can be difficult and costly to treat and dispose of. Owners need disposal options that meet environmental regulations and are still cost-effective. Local and state requirements, in conjunction with the Clean Water Act, will complicate these decisions.

Leachate management alternatives can include:

- Off-site treatment at publicly owned treatment works
- On-site treatment and pretreatment
- Leachate recirculation
- Private off-site treatment
- Trucking vs. pumping
- Surface water discharge
- Discharge options

Leachate Management Problems

Landfill leachate is subject to fluctuations in its quality and quantity based on the physical, chemical, biological, and weather related processes that generate leachates. These changes compound the operational requirements of leachate management.

Permit Assistance

Our extensive experience with regulatory agencies can expedite the approval process for your leachate management. Landfill owners face numerous permit requirements for surface water discharge, treatment facility approval,

construction, and pretreatment. EIL's expertise could be the difference between rapid approval of reasonable permit requirements and a costly delay with difficult to attain requirements.

Treatment

EIL's process engineers are experienced in chemical, physical, and biological treatment methods. Our full-service approach includes innovative and proven technologies, so we can provide treatment solutions uniquely designed for your facility.

Our experience with all phases of leachate management, including system operation, allows us to provide you value focused, easy-to-operate systems, with demonstrated equipment and technologies.

Landfill Construction Services

Realizing that the final design is only one step toward successful project completion, EIL provides complete construction related services. From contract administration and resident engineering to surveying and project representation, we tailor our services to meet your needs.

We understand that in today's hectic world, completing projects on-time and within budget is more important than ever before. Services performed include scheduling, cost estimating, and construction management, as well as those contract administration services required to meet project deadlines and budgets, without sacrificing quality.

Construction related services performed include:

- Preconstruction conference
- Construction Staking
- Contract administration
- Shop drawing and submittal review
- Construction schedule review and progress reports
- Construction coordination meetings
- Client-contractor-agency liaison
- Resident engineering/representation
- Field engineering/testing
- Construction Quality Assurance
- Final inspection

- Documentation report and record drawing preparation

Construction Quality Assurance (CQA)

Construction of solid waste management facilities requires the services of a qualified Quality Assurance (QA) team. The QA team observes and documents the activities of the contractor in sufficient detail and continuity to provide the required level of confidence that the work product complies with the design drawings, specifications and applicable regulatory requirements. Our personnel have experience with both factory and field QA programs and are thoroughly trained in the installation and testing of geosynthetic liners, soil liners, composite liners, geosynthetic capping, soil capping, leachate collection, conveyance and storage facilities, landfill gas management systems, and other solid waste related projects.

Soil Liner Construction Quality Assurance (CQA)

Prior to construction, EIL will conduct testing, as appropriate, to determine the adequacy of selected soils, and to establish the field procedures required to meet the design specifications and permit requirements. During construction, EIL provides field services to document the limits of construction, observes subgrade preparation prior to liner placement, observes and documents staged soils placement, and provides field and laboratory soils conformance tests.

Geosynthetic Field Construction Quality Assurance (CQA)

EIL provides documentation and continuous observation of geosynthetic liner material deployment including geomembrane liner, geonet, geotextiles, geocomposites, and geogrid. This effort includes inventory of all geosynthetic liner materials brought to the site, and examination of factory quality control tests for the materials. Conformance sampling and testing is performed, and the materials are visually observed for damage and cleanliness prior to deployment. Continuous observation and documentation occurs during liner panel placement, welding machine trial tests, panel seam welding, non-destructive seam testing, destructive seam sample selection, and liner repairing. All efforts are monitored and documented. Any deviations from the design and standards are immediately reported to the owner.

Documentation

Daily field logs detailing the work performed, personnel and equipment involved, weather conditions, sampling, testing, meetings, and telephone conversations are maintained. Field data is logged in a computer program to enhance back checking and cross checking of geosynthetic deployment activities. Photographic documentation is provided throughout the construction period showing typical construction procedures, details, and any special or critical installation techniques or conditions.

Documentation drawings are prepared showing soil subgrade and clay liner elevations and coordinate locations, geomembrane panel placement, patches and repairs, drainage and protective cover layer elevations, alignment and elevation of leachate piping, cap construction, and other details. EIL's documentation report includes a narrative describing the CQA program, the project construction

history, results of all test data, field data, and a statement by the certifying professional engineer regarding the quality of the construction.

RCRA AND CERCLA SERVICES

EIL's RCRA and CERCLA related experience includes:

- RCRA facility assessments
- RCRA facility investigations
- RCRA corrective measure studies, including remedial design, plans and specifications
- RCRA Part B reporting and compliance
- Hydrogeologic investigations, pump tests, groundwater modeling, and installation of groundwater monitoring devices
- CERCLA preliminary assessment
- Remedial investigation/Feasibility study
- Remedial design/Remedial action
- National Priorities List de-listing
- Hazard Ranking System scoring

REMEDIATION SYSTEM DESIGN AND ENGINEERING

EIL personnel have experience in design, installation, operation, and maintenance of containment, recovery, and treatment systems to address soil and groundwater contamination. EIL professionals utilize innovative remedial technologies such as oxidation, chemical destruction, in-situ bioremediation, and natural attenuation to obtain closure.

EIL personnel have experience in utilizing regulatory-accepted computer models to aid in the evaluation of site-specific hydrogeologic conditions, design optimal and cost-effective remedial systems, and evaluate the health risks associated with alternative remedial options.

GEOTECHNICAL ENGINEERING AND GEOLOGY / HYDROGEOLOGY

EIL personnel have experience in managing and conducting geotechnical pre-design and pre-construction investigations. EIL's geotechnical experience includes the following:

- Drilling
- Engineering Geology
- Geochemistry
- Geophysics
- Hydrogeology

INFORMATION AND DATA MANAGEMENT

EIL's Information Management Systems (IMSs) are customized Microsoft Access 2000® databases designed specifically to manage an unlimited quantity of information and data. These systems flexibly and efficiently organize, filter, evaluate, and permanently archive groundwater, landfill gas, and leachate data. EIL can develop an IMS that is tailored to serve as a comprehensive multi-site management tool for your sites.

While the primary function of the IMS is compliance reporting, we have also developed data screens that provide an objective feedback loop for landfill gas collection system operations, identifying and documenting operational issues to provide both the site operators with the information they need to better manage and maintain the gas system. Our data management tool helps move gas collection system operations from "black magic" to science and can identify operational issues before they become compliance issues – or worse.

The advantages of EIL's IMSs over a manual/spreadsheet approach to data management are as follows:

- Improved Data Access
- Improved data completeness, integrity, and accuracy
- Enhanced efficiency
- Increased reporting flexibility
- Enhanced data security
- Lower project costs



Representative Projects – Landfill Design

**We Have the Experience
to Make Your Project a
Success**

Project Experience

The following descriptions provide several typical projects that EIL personnel have performed in the past.

City of Gary Sanitary Landfill Post-Closure Services

Gary, Indiana

EIL personnel have carried out a variety of engineering services relating to evaluation, assessment, permitting, design, and construction for the landfill following its closure. EIL personnel have performed assessments, evaluations, reporting, recommendations, designs, construction oversight, and implementation relating to the following aspects of the landfill:

- Final cover system integrity and effectiveness
- Soil erosion and lack of vegetation
- Surface water management system effectiveness
- Sedimentation and erosion control features
- Gas migration presence in the landfill cover and at the landfill perimeter
- Air permitting strategies, negotiations, and applications with IDEM
- Landfill emissions monitoring
- Perimeter gas control system inspection, monitoring, operation, troubleshooting, and maintenance
- Perimeter slurry wall integrity and effectiveness
- Groundwater and surface water monitoring data
- Post closure inspection and maintenance activities
- Peer review and technical resource for gas management and recovery system designs
- Technical consultant during meetings with IDEM

Landfill Investigation and Closure Design**IEPA Abandoned Sites**

Waste Hauling, Bath, and Rhodes Landfills – Macon County, Illinois

EIL personnel were selected by the Illinois Environmental Protection Agency (IEPA) to provide engineering and construction management services for three landfills under their Abandoned Closed Sites Remediation Program. EIL personnel completed engineering design services and initiated construction management work for two of the three sites.

The sites are located in Macon County, Illinois and encompass approximately 10 to 20 acres of landfill area.

IEPA's principal goal of the projects was to reduce the risks posed to the environment by the landfills. More specifically, the objective is to reduce the generation of leachate by:

- Regrading portions of the landfills to improve drainage and stability of the slopes;
- Improving the existing cover on the landfills and constructing a new final cover in areas where the current cover is inadequate; and
- Stabilizing the bank of the river that borders one side of one of the sites.

To achieve these objectives, EIL personnel performed the following tasks for the two landfills:

- Conducted a site investigation and prepared a report of findings;
- Prepared a construction level design of the proposed improvements to the landfill final grading, cover, surface water management system, and riverbank; and
- Perform construction management and construction oversight of the contractor who implemented the proposed designs at the two sites.

Closed Site Design, Permitting, and Reporting

Waste Management Closed Sites Management Group – Midwest Region

EIL personnel performed engineering, permitting, and operations and maintenance activities associated with seven closed landfills in Illinois and Indiana. Work included routine permitting and compliance submittals, permit updates, permit applications for modifications to the final cover and other regulated features; routine groundwater, surface water, and landfill gas monitoring; and engineering related to landfill gas collection system, final cover improvements, surface water features, and leachate collection system. Responsible for identifying staff to complete tasks, managing budgets and schedules, performing engineering work, meeting and negotiating with regulators and site owners, and preparing reports and documents.

Closed Site Management Program

Waste Management, Inc., Indiana, Michigan, Ohio, and Kentucky

EIL personnel managed routine monitoring and maintenance activities at 17 closed landfill sites in Indiana, Michigan, Ohio, and Kentucky. The focus of the closed site program was to manage the client's risks and develop the baseline information necessary to develop cost-effective solutions to environmental problems at these sites.

EIL personnel provided management, technical, and field services for all monitoring and maintenance activities at the site. The maintenance activities included: cap maintenance and repairs, preventative maintenance, leachate seep and erosion, vegetative cover repairs, gas extraction system maintenance,

condensate/leachate tank pumping and disposal, and leachate removal and disposal. The monitoring program included sampling of groundwater, leachate, surface water, and explosive gas.

EIL personnel also provided assistance on special assignments related to the closed landfills including installing additional monitoring wells and gas probes, implementing approved gas management plans and groundwater monitoring plans, developing site-specific plans and arranging for photography of the site for record-keeping purposes.

Landfill End Use Plans

Illinois

EIL personnel have prepared post-closure plans for many landfill sites. Included in the plans for quite a few of these sites are end use plans that include descriptions, layouts, and details that describe how the landfill can continue to be an asset to the community following closure. End use designs have ranged from simple grassed nature areas to more elaborate public recreational use areas. Some of the features that EIL personnel have designed as part of end use plans are:

- Sledding and downhill ski runs
- Golf course and driving range
- Sports fields (i.e., softball, baseball, football, and soccer)
- Model airplane field
- Trails for running, biking, walking, horseback riding, and cross-country skiing
- Nature area with gravel or paved walkways and picnic areas
- Native prairie grass and/or wildflower areas
- Typical grassland areas with vegetation appropriate for the area and the site-specific conditions

The specific end use(s) chosen for a site is based on consideration of public input, needs or desires of the owner or community, financial and safety constraints, and practicality (i.e., keep long-term O&M costs to a minimum).

Alternative Final Cover Permitting. Columbia Ridge Landfill and Recycling Center

Arlington, Oregon.

EIL staff successfully obtained a permit for Columbia Ridge Landfill to construct a final cover that is an alternative to the composite cover prescribed by Subtitle D and the Oregon solid waste regulations. The alternative cover will be composed entirely of soil and will function as an evapotranspiration (ET) cover, storing precipitation in the cover soils until it is removed by evaporation or transpiration of vegetation in the cover. The project involved modeling the migration of rain

water down through the cover as well as the migration of landfill gas upward through the cover. Modeling was able to show that both rain water infiltration and landfill gas emissions would meet very aggressive performance standards. Approval of this cover will save the landfill millions of dollars in final cover construction costs.

Site Development Design Project

Waste Management, Inc., Columbia Ridge Landfill and Recycling Center - Arlington, Oregon

EIL personnel have prepared a redesign of all aspects of the Columbia Ridge Landfill including permit level plans, written design report, construction cost estimate, and closure/post-closure report. The redesign, titled "Site Development Update", was initiated to tie into the existing landfill progression and replace the design in-place for the landfill at the time. Design work performed by EIL personnel included optimization of the following aspects of the site: excavation timing, earth and refuse haul costs, capital expenditures, stockpiling, surface water management, ease of construction, and long-term slope exposure. The site redesign encompassed an approximately 650-acre area for landfiling of the overall site permitted acreage of 2000 acres.

Waste Disposal Cells Design/Build, East Bear Creek Valley Environmental Management Waste Management Facility

Bechtel Jacobs Company LLC, Oak Ridge, Tennessee

EIL personnel prepared design and construction plans and details associated with the development of new landfill cells for disposal of low-level radioactive hazardous waste at the DOE facility. The design and drawing preparation incorporated a double geosynthetic base liner system for the 10 acre landfill disposal cells, and incorporated other features associated with facility development including security fencing, surface water drainage, access, and lighting.

Twin Bridges Landfill, Major Permit Modification

Danville, Indiana

EIL personnel prepared a landfill design and permit application for a 130-acre landfill expansion.

Whiteside County Landfill, Landfill Remediation Program Management

Illinois

EIL personnel, as Program Manager, performed remediation of closed county landfill. Directed corrective measures evaluation, 30% design and permitting, 100% design/construction documents, and construction quality assurance, start-up, ongoing permitting, and operations optimization. Permitted design included horizontal, directionally drilled leachate extraction wells, leachate force main, leachate storage tank system, and active landfill gas extraction and management system. Directed work to overcome challenges related to landfill configuration and geology, using innovative, functional, and cost-effective solutions. Conducted negotiations with the regulatory agency. Provided project

management, overall technical direction, pricing, quality control of deliverables, report writing, staffing, and client management.



Representative Projects - Regulatory Permitting and Compliance**Landfill Gas Power Plant Air Compliance Management***Various Locations*

EIL personnel assist a number of landfill gas power plants with maintaining compliance with air-related regulatory programs.

EIL assists a number of landfill gas power plants with maintaining compliance with air-related regulatory programs. These include federal NSPS / State EG landfill air regulations, annual emissions inventories, and Title V reporting. Assistance ranges from reviewing submittals to complete management of all air compliance activities at the plant. Other compliance work includes preparation and certification of SPCC plans and SWPP plans.

Title V Air Operating Permit Application Assistance*Mountain View Reclamation Center, Greencastle, Pennsylvania*

Title V permitting services were provided for the landfill. Sources included landfill, working face, leachate treatment plant, enclosed flare, and other sources. Guidance was provided to the environmental and facility operations personnel to assure that they were prepared for continuing compliance with subsequent Title V air operating permit requirements.

Title V Permitting*Various Sites, Indiana*

EIL personnel prepared Title V applications for six landfills in Indiana: Twin Bridges RDF, Prairie View RDF, Wheeler RDF, Deercroft RDF, Oak Ridge RDF, and Blackfoot RDF. Four of these landfills have reciprocating engine power plants. Participated in the regulatory negotiations with IDEM.

NSPS/EG Compliance*Multiple Sites, Illinois*

EIL personnel have provided NSPS compliance assistance to a number of landfills in Illinois, from the submittal of the Initial Design Capacity Report to follow-up permitting and reporting.

NSPS/EG Compliance*Multiple Sites*

EIL personnel have provided NSPS compliance assistance to a landfill near Columbus, Ohio, from the submittal of the Initial Design Capacity Report to operation and maintenance of their gas collection system. Construction drawings and specifications for the gas system design were prepared and assisted with bidder selection and equipment procurement. The O&M contract for the landfill gas collection system includes monthly NSPS wellfield monitoring, quarterly surface scans, conducting the initial performance test on the utility flare, preparing the annual NSPS compliance reports, preparing the annual air emissions inventory reports, and creating/ maintaining the site's required NSPS file system. EIL personnel also provide semi-annual groundwater sampling services to the site.

Gas Recovery Plant Permitting

Wheeler Landfill, Wheeler, Indiana

Severe non-attainment area
made this quite challenging

A permit application was prepared for the construction and operation of a three 3516 engine gas recovery plant at a closed landfill in northern Indiana. The plant was to be located in a severe non-attainment area for ozone, which presented a challenge from an air permitting standpoint. EIL personnel were able to obtain a permit for the facility by utilizing creditable emissions from an existing gas flare to offset the new emissions from the three proposed engines.

Recovery Plant Permitting

Lake View Landfill, Erie, Pennsylvania

A plan approval was prepared for the construction of a two 3616 engine gas recovery plant at an active landfill in Erie, Pennsylvania. This plant will be the first in the United States to utilize the 3616 engine. The engine contains state of the art controls to limit emissions of NO_x, which make it ideal for ozone non-attainment areas.



Representative Projects - Gas Collection System Design and Engineering**Landfill Gas Migration Control***Milwaukee, Wisconsin*

EIL personnel developed and implemented an investigative program to monitor the potential for landfill gas to migrate into buildings at and adjacent to two landfill sites in the Milwaukee area. The program included barhole probe monitoring, installation of gas monitoring probes around the sites and below the building floor slabs, and monitoring of gas conditions in the probes as well as buildings.

**Landfill Gas Migration Control-Congress Development Co.
Landfill***Hillside, Illinois*

EIL personnel designed and installed a dual landfill gas/leachate extraction system to replace an existing system that had fallen into disrepair. The replacement system, which included over 110 extraction wells connected to over two miles of header piping, was installed and operational within a two-month period. EIL personnel also designed and installed a perimeter landfill gas control system consisting of approximately 150 perimeter landfill gas control wells installed in bedrock to eliminate the off-site migration of landfill gas. The perimeter well system is unique because the individual wells were installed at a 45-degree angle to increase the likelihood of intersecting two prominent vertical joint sets and, therefore, the potential for controlling the off-site gas migration. Since completing the perimeter landfill gas control system the off-site landfill gas migration has been completely eliminated.

Landfill Gas Migration—Two Rivers Landfill*Two Rivers, Wisconsin*

A landfill gas management system was designed for the City of Two Rivers Landfill to control off-site migration of landfill gas. Barhole probe testing and basement monitoring of homes revealed a localized area of high methane concentration in the soil near an unoccupied home. The gas remediation design included design of passive gas cut-off trench and barrier wall to limit migration. In addition, gas monitoring probes were installed.

Permit and Construction Design*DFW Recycling and Disposal Facility, Lewisville, Texas.*

EIL personnel prepared a permit and construction design for a gas management system in coordination with the DFW Landfill. During this project, a series of vertical wells were designed. The design also incorporated horizontal trench wells where landfill elevations were below current permitted final grades.

Landfill Gas Collection System Design

Trail Ridge Landfill, Baldwin, Florida.

EIL personnel developed a set of construction drawings and technical specifications for Phase I of the gas management system. The permitted filling progression for this facility provided some unique challenges resulting in a complete redesign of the permitted intermediate grades. The revised grades were developed specifically to handle the anticipated differential waste settlements which could reduce the overall efficiency of the system. The proposed grades provided the facility with an enhanced storm water management plan which would significantly reduce the amount of leachate produced by the landfill. The proposed design also anticipated the site's fill progression eliminating the need for a condensate pump station. This project not only gave the client a sound set of gas construction plans but effectively integrated other aspects of the design to significantly reduce the facility's construction maintenance and operating cost. Submitted to bidders in March 1998.

Gas Management System Design

West Camden Sanitary Landfill, Camden, Tennessee

EIL personnel redesigned the entire system to reduce construction costs and to meet NSPS requirements.

EIL personnel redesigned the entire system to reduce construction costs and to meet NSPS requirements. Provided specific information for the construction of the pump station, header and lateral pipe sizing, condensate tank, and flare station. Provided permit documentation with narrative and engineering calculations to document the system's compliance with NSPS. Prepared bid documents, construction specifications and bill of materials for bid solicitation for the construction of Phases I through III of the facility. Sent out to Bidders in April 1997 and constructed first quarter 1998.

Landfill Gas Management System, Rodefild Site No.2

Dane County, Madison, Wisconsin

Dane County proposed a 28-acre horizontal and 24-acre vertical landfill expansion at the Rodefild Site No. 2 Landfill in Madison, Wisconsin. This proposed Phase I gas management system expansion included 18 additional vertical gas wells and related gas header, and the connection of 13 existing vertical gas wells to a new gas header system. The complete system will be connected to a new electrical energy facility that will utilize the methane gas to produce electrical energy.

The design of the new wells and headers with connections to the existing wells incorporated many of the unique design features that were designed and field tested by EIL personnel since 1985. EIL personnel have been involved in over 150 landfill gas management systems since 1985 and this vast experience allowed EIL personnel to design a system for Dane County that met their unique requirements. Our design accomplished the client's goal and the county is now generating revenues versus flaring the gas off.

Landfill Gas Control System–Parkview Landfill

Menomonee Falls, Wisconsin

EIL personnel designed a gas control system for the Parkview landfill that permits extraction of gas from the base through leachate collection piping as well as gas extraction from the upper zones and interior of the landfill with conventional vertical wells. The 45-acre, 4.25 million cubic yard landfill design includes 7,000 feet of landfill gas/leachate collection piping, 11 vertical gas extraction wells, and 8,000 feet of high-density polyethylene pipe to be installed just below the final cap for collecting gas from the vertical wells and bottom piping network.

Design and Construction of Gas Recovery System,

Hardy Road Landfill, Akron, Ohio



Installation of a 16-inch header and 24-inch corrugated metal pipe protective road crossing at Hardy Road Landfill

EIL personnel designed and installed a system to collect and flare methane gas using the facility New Source Performance Standard (NSPS) design as a conceptual guide. The system was designed to collect more than 2,000 cubic feet per minute of methane. The work also included the installation of knockouts, a blower flare station and a new 5,000-gallon below grade condensate tank. A cost saving initiative that used the existing above ground storage tank for condensate and leachate storage was also developed.

The scope of work includes the following major components:

- Installation of 10 gas recovery wells incorporating approximately 515 vertical feet of 36-inch diameter well and 8-inch piping
- Installation of HDPE SDR 17 Pipe Header (1,450 LF 6-inch; 850 LF 8-inch; 560 LF 10-inch; 1,100 LF 14-inch and 250 LF of 16-inch)
- Installation of a 2,000-cfm flare including gas flow monitoring and flare flame monitoring devices, the blower/motor unit, control panel, flare stack, flame arrestor, hardware, electrical connection and grading work
- Installation of gas flow monitoring and flare flame monitoring devices
- Removal of the existing blower/flare unit
- Installation of 10 gas extraction wellheads and associated claymax surface seals

Upon completion of the new gas recovery system, EIL personnel started up and optimized the system by tuning the wellfield and troubleshooting the flare system.



Loading solid waste (trench spoils) for transport to the active landfill face



Representative Projects – Investigation and Testing**Kestrel Hawk Landfill***Racine, Wisconsin*

EIL personnel provided operations and maintenance services as well as NSPS compliance services for a gas collection system at the Kestrel Hawk Landfill in Racine, Wisconsin.

Landfill Gas Migration Control*Milwaukee, Wisconsin*

EIL personnel developed and implemented an investigative program to monitor the potential for landfill gas to migrate into buildings at and adjacent to two landfill sites in the Milwaukee area. The program included barhole probe monitoring, installation of gas monitoring probes around the sites and below the building floor slabs, and monitoring of gas conditions in the probes as well as buildings.

Landfill Gas Migration–Two Rivers Landfill*Two Rivers, Wisconsin*

A landfill gas management system was designed for the City of Two Rivers Landfill to control off-site migration of landfill gas. Barhole probe testing and basement monitoring of homes revealed a localized area of high methane concentration in the soil near an unoccupied home. The gas remediation design included design of passive gas cut-off trench and barrier wall to limit migration. In addition, gas monitoring probes were installed.



Representative Projects - Collection System Operations, Maintenance & Troubleshooting

Kestrel Hawk Landfill

Racine, Wisconsin

EIL provided operations and maintenance services as well as NSPS compliance services for a gas collection system at the Kestrel Hawk Landfill in Racine, Wisconsin.

Approximately 93 gas extraction wells produce more than 1100 scfm of landfill gas, which is compressed and delivered via pipeline to an SC Johnson manufacturing facility with an on-site powerplant that produces 3.5 MW of electricity and 18,000 lbs/hr of process steam.

Responsibilities included O&M of the landfill gas collections system, 6,000 ft of pipeline, a compressor station, utility flare, and one GC gas analyzers that calculates the BTU of the landfill gas.

- Routine O&M services included:
- Weekly monitoring of the wellfield
- Quarterly pipeline inspections
- Daily monitoring and maintenance of the enclosed flare
- Routine maintenance of the three compressors that push gas through the pipeline to the SC Johnson boiler and turbine including the dehydration unit, chiller and oil compressor feed pumps.
- Regular calibration of methane monitors in on-site buildings
- Subtitle D gas probe monitoring.

All monitoring, record keeping, and reporting is done in compliance with the NSPS.

O&M for the Daniel GC computers includes: calibrating the differential pressure transmitter, replacing the helium tanks, replacing the gas chromatograph column, replacing flow meter skid filters, and replacing the calibration gas as needed.

Non-routine maintenance responsibilities include raising/lowering wells, repairing damaged piping, repairs to the pipeline and compressor system, repairs to the GC/flow computers, and responding to emergency callouts.

Monitoring and Operation

Multiple Sites

EIL personnel have performed gas system monitoring and operation of active gas systems in several states, including the following:

Evergreen RDF, Northwood, Ohio – EIL personnel provided design and CQA services for Evergreen's Phase 1 gas collection system. EIL personnel have

provided operations and maintenance services for the gas collection system since 1998.

Statewide Landfill, Canton, Ohio – EIL personnel have been performing O&M services for a closed landfill with an active gas collection system for several years.

WDE Landfill, Andover, Minnesota – EIL personnel provided design, construction management, bid documents, and CQA services for a closed landfill under the State of Minnesota's closed site program. EIL personnel provided O&M of the installed gas system for a year after start-up.

Becker County Landfill, Minnesota – EIL personnel provided CQA and construction management services for a closed landfill in Minnesota. O&M services for the gas collection system were also provided for a year after startup.

Gulf Coast Landfill, Fort Myers, Florida – After providing an NSPS gas system design for the facility and CQA services for gas system installation, EIL personnel operated and maintained the gas system for a year after start-up.

Oakland Heights Development

Auburn Hills, Michigan

Within three months of EIL personnel winning this project, we fixed a number of compliance issues and increased flow to the pipeline by more than 25 %.

EIL personnel provided operations and maintenance services as well as NSPS compliance services for the gas collection system at this landfill. The collection system includes the landfill wellfield (approximately 50 wells), a 2,000 ft of pipeline, enclosed flare, compressor station, and the Daniels GC/Flow computers.

Routine O&M services included:

- Weekly monitoring of the wellfield
- Quarterly pipeline inspections
- Daily monitoring and maintenance of the enclosed flare
- Routine maintenance of two Hoffman blowers that push gas through the pipeline to the GM - Lake Orion Plant boiler system
- Regular calibration of methane monitors in on-site buildings
- Subtitle D gas probe monitoring and reporting

Monitoring, record keeping, and reporting is done in compliance with NSPS.

O&M for the Daniel GC/flow meter includes: calibrating the differential pressure transmitter, replacing the helium tanks, replacing the gas chromatograph column, replacing flow meter skid filters, and replacing the calibration gas as needed.

Non-routine maintenance responsibilities include raising/lowering wells, repairing damaged piping, repairs to the GC/flow computers, and responding to emergency callouts.

Epperson Waste Disposal Facility

Williamstown, Kentucky

EIL personnel's **data management software** has the capability to summarize the results in a variety of formats, and to generate reports that summarize compliance status and upcoming required compliance actions. **It's the best in the business.**

Gas system services at this facility consisted of routine wellfield tuning, Subtitle D gas monitoring, explosive gas monitor calibrations, routine maintenance, data management, and NSPS surface scans.

Routine tuning consists of monthly visits to the facility. Subtitle D gas monitoring and monitor calibration events occur once per quarter. The routine maintenance is performed for the wellfield, blower, flame arrestor, control panel, condensate pump station, and flare station.

Data management is accomplished with software developed by EIL personnel to track the data collected and tuning decisions made during each event. The software has the capability to summarize the results in a variety of formats, and to generate reports that summarize compliance status and upcoming required compliance actions. EIL personnel also performed non-routine maintenance as needed.

Eagle Valley RDF

Orion, Michigan

EIL personnel are responsible for routine and non-routine O&M of:

- ◆ 50 Wells
- ◆ 2,000 ft Pipeline
- ◆ Enclosed Pipeline
- ◆ Compressor Station
- ◆ GC/Flow Computer

EIL personnel provided operations and maintenance services as well as NSPS compliance services for the gas collection system at this landfill. The collection system includes the landfill wellfield (approximately 50 wells), a 2,000 ft of pipeline, enclosed flare, compressor station, and the Daniels GC/Flow computers. Routine O&M services included:

- Weekly monitoring of the wellfield
- Quarterly pipeline inspections
- Daily monitoring and maintenance of the enclosed flare
- Daily monitoring and maintenance of the Dresser-Rand positive displacement compressor
- Regular calibration of methane monitors in on-site buildings
- Subtitle D gas probe monitoring and reporting

EIL personnel were responsible for NSPS compliance activities including monitoring, reporting, and record keeping. This includes preparation of the annual NSPS compliance report. O&M for the Daniel GC/flow meter includes: calibrating the differential pressure transmitter, replacing the helium tanks, replacing the gas chromatograph column, replacing flow meter skid filters, and replacing the calibration gas as needed.

Non-routine maintenance responsibilities include raising/lowering wells, repairing damaged piping, repairs to the GC/flow computers, and responding to emergency callouts.

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Representative Projects - Landfill Gas Recovery and Beneficial Use**Girvin Road Landfill Gas Power Plant***Jacksonville, Florida*

The project consisted of developing a four-engine landfill gas utilization facility for the Girvin Road Landfill site located in Jacksonville, Florida. The project utilized a design/build project approach with EIL personnel serving as the design/builder for the project. The facility houses four reciprocating engine generators (Caterpillar 3516 engines) in an engine generator room and associated electrical motor control center and switchgear in an adjacent electrical control room. The building includes single wythe concrete block construction with metal deck and steel joist roof. Landfill gas is collected from the landfill and directed to the fuel gas compressor skid, which provides compressed landfill gas to the engines. In addition, a step-up transformer is located adjacent to the facility to step-up the facility power to the JEA electrical grid requirements.

EIL personnel services included determining electrical utility interface requirements, designing the power plant, contracting for facility construction, procuring the major facility equipment (including the engine generators, fuel gas compressor, motor control center, switchgear, and step-up transformer), facility startup, and facility operations.

EIL personnel bid the individual major equipment components to selected equipment vendors and obtained the best equipment prices. Concurrently, EIL personnel proceeded with the design process to meet the Owner's requirements and then bid the construction work to previously identified reputable contractors. EIL personnel let separate contracts for the general construction, mechanical construction, and electrical construction. EIL personnel provided an experienced construction manager to manage the facility construction and to supervise the facility construction. Following the completion of facility construction, EIL personnel provided startup services and operations services through a local engine dealer.

**Landfill Gas Power Plant Development and Design – Paxton Landfill***Chicago, Illinois*

EIL personnel won a project to assist the City of Chicago and the Chicago Power Alliance with the development of the landfill gas power plant at an abandoned landfill in the City. The landfill is in an area being redeveloped by the city and the State of Illinois as a renewable energy farm and a model of sustainable industrial development.

EIL personnel's role included:

- Evaluation of gas quality and gas quantity coming from the landfill

- Evaluation of recoverability of gas from the landfill
- Assessment of potential types of compression and combustion equipment and recommendation of optimal design
- Detailed design of the facility
- Assistance with major equipment procurement
- Assistance with utility interconnect negotiations
- Assistance with gas purchase agreement negotiations
- Permitting of the facility
- Construction management and oversight
- Startup and commissioning of the plant
- Training of operators
- Ongoing operations and maintenance assistance

6.6 Megawatt Greene Valley Landfill Gas-to-Electricity Facility

Naperville, Illinois



This project received SWANA's 1998 Excellence in Solid Waste Management Award for Landfill Gas Management.

On June 14, 1996, Waste Management of Illinois, Inc. (WMII) and DuPage County Forest Preserve District (DCFPD) dedicated a landfill gas-to-electricity facility at the Greene Valley Landfill (GVL) in Naperville, Illinois. GVL is owned by DCFPD and operated by WMII. This unique public/private partnership has worked in coordination to develop the facility.

The facility consists of a turbine generator room, fuel gas compressor room, electrical control room, storage room, toilet room, viewing area, and office/conference area. The plant utilizes two Solar Turbines, Inc. Centaur turbine generators, two Dresser-Rand fuel gas compressors, associated electrical switchgear/motor control center, and exterior electrical transformers.

EIL personnel provided engineering and project management services for the gas-to-electricity facility itself, including utility negotiations, permitting assistance, equipment procurement assistance, construction document package preparation, shop drawing review, construction management assistance, start-up assistance, and record drawing preparation. EIL personnel also provided full engineering services to the client for the design and construction management of the installation of the collection system to supply the landfill gas to the gas-to-electricity facility.

To extract gas from the landfill in a controlled manner, a landfill gas collection system was designed and installed. The system consists of over 100 gas extraction wells and several miles of collection pipe. The gas collection wells are

adjusted so that areas of the landfill producing differing gas quantities can be balanced to maximize methane levels in the recovered gas. The recovered gas is routed through the buried gas collection header lines to the gas-to-electricity facility. Gas compressors are used to apply a vacuum to the gas collection system within the landfill and to increase the gas pressure and density at the gas-to-electricity facility. The cleaned and compressed gas is then sent as fuel to two Solar Turbines, Inc. Centaur combustion gas turbine engines rated at 4,000 horsepower each, which utilize up to four million cubic feet per day of landfill gas. Each of these engines powers an electrical generator that is connected to the Commonwealth Edison Company power distribution grid.

Prairie View Gas Recovery Facility

Wyatt, Indiana

The project consisted of developing a four-engine landfill gas power plant for the Prairie View Recycling and Disposal Facility site located in Wyatt, Indiana. The project was developed utilizing a design/build project approach with EIL personnel serving as the design/builder for the project. The gas recovery facility is a four reciprocating engine facility consisting of single wythe concrete block construction with metal deck and steel joist roof. The facility houses three reciprocating engine generators (Caterpillar 3516 engines) in an engine generator room, a single fuel gas compressor in a compressor room, and associated electrical motor control center and switchgear in an adjacent electrical control room. Landfill gas is collected from the landfill and directed to the fuel gas compressor skid, which provides compressed, cooled, and dehydrated landfill gas to the engines. In addition, a step-up transformer is located adjacent to the facility to step-up the facility power to the electrical utility grid requirements.



Representative Projects – Groundwater and Environmental Compliance

EIL currently manages the groundwater compliance programs at over thirty active and closed solid waste sites located in Illinois, Indiana, and Pennsylvania. Our responsibilities include coordination with the analytical laboratories and field sampling technicians so that permit-required sampling is performed in a timely fashion. We then coordinate with the analytical laboratory so that their data deliverables are provided in a format that can be imported directly into our groundwater management database. The data is then screened, organized, and used to generate summary tables and concentration time trends in support of the routine compliance reports. In some cases, we revise background standards when we can demonstrate that existing standards are not representative of site groundwater conditions. When necessary, we develop and implement assessment monitoring and corrective action measures to address exceedances of permit groundwater standards.

Congress Development Company Landfill

Hillside, Illinois

We manage the IEPA and Metropolitan Water Reclamation District of Greater Chicago-required air, groundwater, and leachate monitoring and reporting required at this active landfill. We have managed and prepared a comprehensive hydrogeologic characterization report establishing potential off-site sources of VOCs detected in groundwater monitoring wells. This report was accepted without comment by the IEPA. We have prepared and submitted numerous revisions to the statistical programs for the groundwater monitoring program at the facility.

Village of Bensenville Landfill

Bensenville, Illinois

Prepared and submitted a plan to allow disposal of contaminated soil at this closed site. Documented soil disposal operations. Prepared a report requesting that the IEPA release the site from post-closure care. The report included an evaluation of landfill gas impacts, current groundwater quality, potential for future impacts to groundwater, and the current status of post-closure care maintenance. Prepared a landfill gas investigation in support of the request for release from post-closure care that was approved by the IEPA without comment. Participated in lengthy negotiations with the IEPA and prepared numerous groundwater evaluation reports in further support of the request for release from post-closure care. The IEPA accepted the demonstrations but required that the Illinois Pollution Control Board (IPCB) be petitioned for an adjusted standard for chloride as a pre-condition for being released from post-closure care. Prepared the necessary demonstrations and successfully petitioned the IPCB for the adjusted standard. The IEPA subsequently released the Village from the requirements of post-closure care.

Chestnut Landfill (Mercedes Builders & Development)*Glenview, Illinois*

Managed and performed routine groundwater monitoring and compliance reporting at this closed site. Applied to IEPA for a release from post-closure care monitoring. Performed landfill gas and groundwater evaluations to show that the site was not a threat to human health or the environment. Demonstrated that the existing groundwater monitoring well network was inadequate on the basis that the wells were screened in refuse. Installed new deep bedrock monitoring wells and sampled the groundwater to show that no leakage from the landfill had occurred. On this basis the IEPA granted a release from post-closure care.

Des Plaines Landfill (Sexton Companies)*Des Plaines, Illinois*

Managed and performed an evaluation of the current compliance program at this closed facility. Managed and prepared a leachate management plan, a groundwater assessment plan, and a permit-required demonstration of the adequacy of the groundwater monitoring program. The demonstration of the adequacy of the groundwater monitoring program included a detailed analysis of site geologic data supported by geotechnical investigations conducted to supplement historical site information. The leachate management plan included conceptualization of a perimeter leachate control system to prevent seeps. Radioisotopic analyses were utilized to determine the source of methane gas detected in a well near the landfill. Conceptualized, designed, and constructed a leachate/groundwater interception trench. Participated in negotiations and meetings with IEPA and established three discreet groundwater management zones (GMZs). Performed specific GMZ groundwater monitoring and evaluated annually site groundwater quality on the basis of GMZ monitoring in order to assess the effectiveness of the remedial systems. Conducted quarterly gas monitoring at the facility. Prepared post closure care cost estimates, annual reports, and annual groundwater flow reports.

Adams Center Landfill (Chemical Waste Management of Indiana, LLC)*Ft. Wayne, Indiana*

Provided technical support during the development and negotiating phases for the site post-closure monitoring plan that had been unapproved for a period of three years. Designed a post-closure groundwater monitoring network and statistical management plan. Participated in numerous negotiations with IDEM regarding the technical aspects of the plan. The negotiations were focused on the complicated site hydrogeology, selection

of adequate groundwater monitoring points, and selection of constituents of concern to be monitored in post-closure. Ultimately, the post-closure monitoring plan was approved by the IDEM.

Zion Site 2, Valley View, and Orchard Hills Landfills (Onyx Waste Systems)

Zion, Illinois; Decatur, Illinois; Davis Junction, Illinois

We manage all groundwater compliance-related issues at these three active landfills. Responsibilities include coordinating with the analytical laboratory and field sampling technicians to complete the required quarterly sampling in a timely manner. We subsequently manage the groundwater data, prepare summary tables, concentration time trends, and the required routine statistical analysis reports. Periodically, we submit proposed permit modifications to request revised statistical standards based on site-specific demonstrations that show the existing statistical standards may no longer be appropriate. When necessary, we prepare assessment monitoring plans and implement corrective action measures to address groundwater issues.



Representative Projects – Landfill Construction Services**Construction Quality Control and Quality Assurance***Multiple Sites*

EIL personnel have performed the QC/QA work for many construction projects at solid waste municipal landfills, including:

Greene Valley Landfill, Naperville, Illinois – EIL personnel provided QC/QA work for cell construction and final cover installation (including soil and geosynthetic covers) as well as associated surface water management system construction. After completion of the construction, CQA acceptance reports were prepared and submitted to Illinois EPA.

Envirofil of Illinois, Inc., Macomb, Illinois – EIL personnel provided QC/QA work for cell base liner, final cover, and gas extraction wells construction, including field inspection, CQA services, engineering documentation, testing, and report preparation.

Countryside Landfill, Cells 4, 5, and 6 CQA, Grayslake, Illinois - EIL personnel provided QC/QA work for composite lined cell base liner, including field inspection, CQA services, engineering documentation, testing, and report preparation.

Waste Management, Inc., CID RDF - Area 4 Landfill Phase VI CQA, Calumet City, Illinois - EIL personnel provided QC/QA work for a hazardous waste composite lined cell base liner, including field inspection, CQA services, engineering documentation, testing, and report preparation. Modified permit based grade design to reduce number of leachate collection manholes, increase airspace, and reduce construction costs. Established functional equivalency of the modified design with the Illinois EPA.

Gas System Construction Inspection – Omega Hills Landfill*Germantown, Wisconsin*

A landfill gas control system was installed at Omega Hills Landfill to utilize gas recovery for the generation of electricity. The gas collection system consists of 45 gas extraction wells, associated header pipe, gas turbines, and generators. Many of the extraction wells were not connected to the system at the time of installation because waste grades had not reached final elevations. As final grades were reached, the gas wells were extended and subsequently connected to the main as collection header pipe. Inspection services will be provided to document the installation of approximately 2,900 feet of lateral gas piping between the extraction wells and the main gas header pipe.

Landfill Gas Management Technical Services – Springhill Regional Sanitary Landfill*Graceville, Florida*

EIL personnel provided construction design, construction documentation, engineering assistance, and construction quality assurance services for a landfill

gas management system at the Springhill Landfill. Construction drawings were developed for Phase 2 of the gas collection system. A design review was conducted to finalize the construction design plan for the gas management system. The plans included header layout on the most recent topographic map with the revised grading plan and gas management system details.

EIL personnel prepared the documentation necessary to successfully bid and install this initial phase of the landfill gas management system. The project team reviewed construction specifications for the gas extraction wells, header pipelines, and liquid management systems, from the project manual developed during the Phase 1 construction of the gas collection system. The existing specifications were reviewed and additional specifications were added following the Construction Specification Institute three-part format. Bid documents were prepared for bid solicitation. The project team provided a construction documentation package (bid documents and construction specifications).

Engineering assistance during the construction of the Phase 2 gas collection system was critical because refuse elevations were not at final grades at the time of construction. As a result, the site needed technical support throughout the installation period to facilitate the system's construction.

Construction quality assurance services were provided to document the gas extraction well installation and landfill gas management system expansion. Reconstruction of the final cover in the gas header pipe trench was in accordance with the requirements of the permit in effect at the time of the original final cover construction. A verification report was prepared to document the reconstruction of the final cover.

Five Oaks Landfill Gas Management System Installation

Waste Management - Illinois, Taylorville, Illinois

EIL personnel provided engineering design services, technical services, and construction documentation for installation of a gas management system at the Five Oaks Recycling and Disposal Facility.

The construction design consisted of engineering design and specifications for gas extraction wells, header and lateral pipelines, condensate management, and gas flaring systems. It also included design and specification of the pneumatic liquid pumping system, including the air compressor, air line, pneumatic pumps, and pump stations. Electrical design was provided to support the flare, air compressor, and storage tanks and to provide communication between this equipment. The construction design schedule was significantly compressed to satisfy the client's needs.

Landfill gas was directed to a central location for flaring via a network of high-density polyethylene header pipe. The header pipe was routed to minimize impact on the final cover and on landfill operations at the site, and installation was completed while the landfill continued to operate. The header pipe was sized to handle both gas and leachate volumes. Vertical wells were used to extract both gas and leachate. Blind flanges were incorporated into the design to allow for future expansion.

The design generally followed the contour of the landfill to the extent possible to minimize excavation depths. Header access risers were included to accommodate future vertical expansions and provide system access points. Liquid extraction systems were designed at strategic low points throughout the gas system. A pneumatic system, including an air compressor, was designed to provide air pressure to each well head for potential leachate extraction.

Two prime contractors were used for the landfill gas system work and electrical work. EIL personnel prepared bid documents, recommended a successful bidder for each category, and finalized the contract documents with each contractor.

EIL personnel provided CQA and field engineering services during the 15 weeks of construction. The objective was to ensure that the gas collection, compressor, and flaring system were constructed in compliance with the engineering design and environmental permits, but at the lowest practical cost to Five Oaks. EIL personnel performed on-site, quality assurance and quality control inspections and documentation functions and helped Five Oaks resolve construction-related questions.

EIL personnel provided one field inspector one day a week during the drilling and installation of the proposed combination gas/leachate extraction wells. The inspector attended the weekly construction status meetings with the drilling contractor, reviewed well borelog and construction information developed by the drilling contractor, and maintained drilling installation quality assurance and quality control techniques.

EIL personnel also provided staff during the installation of the gas header pipe, air lines, liquid management facilities, air compressor, and flare station. This work included attending preconstruction meeting with the system installation contractor, attending weekly construction status meetings, reviewing pipeline survey and routing, inspecting trench bedding and backfill, reporting to Five Oaks whenever it was believed that work was unsatisfactory, maintaining system installation quality assurance and quality control techniques, and verifying that the contractor met drawing and specification requirements.

EIL personnel completed the project on schedule and within budget and were commended for a 12-day design turnaround, which exceeded the client's expectations.



References

The following references are familiar with work previously completed by EIL personnel. Additional references are available on request.

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Resumes

Attached are resumes for the three EIL staff members that will be involved with the IPC Site long-term groundwater monitoring project. Dr. Corgiat and Mr. Hirt are based out of EIL's Wheaton, Illinois office. Ms. Mary Pearson is based out of Rockford, Illinois. Additional EIL personnel resumes are available on request.

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